

POSTER SESSION

1057 Coronary Flow and Vasomotor Activity

Sunday, March 17, 2002, 3:00 p.m.-5:00 p.m.

Georgia World Congress Center, Hall G

Presentation Hour: 3:00 p.m.-4:00 p.m.

1057-85**Long-Term Effects of Thiazolidinedione on Vasomotion of Resistance Coronary Arteries in Type-2 Diabetics**

Tatsuaki Murakami, Masateru Ohnaka, Fukui Cardiovascular Center, Fukui, Japan.

Background: Insulin resistance is thought to be highly involved in atherothrombotic processes and effects of insulin sensitizer on coronary artery pathophysiology have marked attention, but the long-term effects remain uncertain. This study evaluated long-term effects of thiazolidinedione, an insulin sensitizer, on vasomotion of resistance coronary arteries which are frequently affected by diabetes mellitus.

Methods: Type-2 diabetic patients (n=22) who underwent coronary angiography and flow-dynamic examinations were enrolled into this study of thiazolidinedione, and randomized where they received troglitazone (400 mg per day) for more than 1 year (group-T), or they received therapy with diet or glibenclamide for more than 1 year (group-C). We measured endothelium-independent or endothelium-dependent response of resistance coronary arteries to ATP (50µg) or acetylcholine (50µg) into the study (normal or minimally diseased) left coronary artery. Reactive changes in coronary blood flow (coronary flow reserve (CFR): maximal hyperemic flow - baseline flow / baseline flow) were quantified by coronary angiography and intracoronary doppler-guidewire. Changes in CFR from the baseline to the follow-up point were compared between the 2 study groups.

Results: Group-T (n=11) manifested good compliance to the treatment and improvements in insulin resistant variables (HOMA index; group-T versus group-C: from 2.56 ± 1.41 to 2.13 ± 1.14 , $p=0.021$, versus, from 2.55 ± 1.24 to 2.56 ± 1.23 , $p=0.902$). CFR to ATP (FN) increased in group-T but not in group-C (group-T versus group-C: from $178 \pm 84\%$ to $230 \pm 110\%$, $p=0.027$, versus, from $195 \pm 62\%$ to $188 \pm 68\%$, $p=0.102$). CFR to acetylcholine (FE) also increased in group-T and decreased in group-C (group-T versus group-C: from $52 \pm 15\%$ to $132 \pm 64\%$, $p=0.006$, versus, from $50 \pm 19\%$ to $40 \pm 22\%$, $p=0.028$). Changes of FN or FE did not correlate to those of HOMA index (FN: $r=0.18$, $p=0.69$, FE: $r=0.14$, $p=0.85$).

Conclusion: This study suggests that long-term thiazolidinedione use improves vasomotion of resistance coronary arteries independent of reversal for insulin resistance, which may have beneficial potentials for coronary artery disease with type-2 diabetes mellitus.

1057-86**NTG-Enhanced Coronary MRA: Improved SNR and Vasodilation Time Course**

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Background:

High-resolution coronary MRA can achieve sub-mm resolution, but is still challenged by the small size of coronary arteries. NTG-induced vasodilation for coronary MRA may both improve image quality and allow for the noninvasive study of coronary vasomotor function. Therefore, we studied patients and volunteers for NTG-induced changes in coronary SNR and coronary size, including vasodilation time course.

Methods:

Coronary MRA was performed in 30 subjects - 12 patients (6 with CAD and 6 s/p heart transplant, age 55 ± 18 years) and 18 healthy volunteers (age 34 ± 4 years). A 1.5 Tesla GE Signa scanner was used, equipped with high-performance gradients (40mT/m, 150mT/m/ms) and a real-time interactive workstation. Real-time imaging was used to prescribe views of the right and left coronary arteries. Then, high-resolution multi-slice coronary MRA was performed before and after 0.4 mg sl NTG (in-plane resolution of 0.5-0.75 mm). Quantitative analysis of 1) coronary SNR on in-plane images and 2) cross-sectional area on thru-plane images was performed before and up to 30 min after NTG.

Results:

Coronary vasodilation was evident on in-plane and thru-plane coronary images and all subjects tolerated the procedure without complications. SNR on thru-plane coronary images increased 21% post NTG (11.2 ± 5.8 to 13.6 ± 5.6 , $p<0.0005$). RCA cross-sectional area increased 27% post NTG (16.9 ± 7.8 mm² to 20.8 ± 8.9 mm², $p<0.0001$). Time course analysis demonstrated maximum vasodilation at 5-7 min with return toward baseline by 15 min. Inter-observer reliability for coronary measurement analysis was 94%. On subgroup analysis, no significant differences in coronary vasodilation were seen, though there was a trend toward decreased vasodilation in patients with CAD.

Conclusions:

NTG-enhanced coronary MRA is safe and provides improved SNR and noninvasive evaluation of coronary vasomotor function. More routine use of NTG should be considered for coronary MRA studies.

1057-87**Effect of Long-Term Oral Betablocker Treatment on Myocardial Blood Flow and Coronary Flow Reserve in CAD-Patients Assessed With PET**

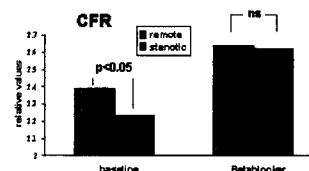
Pascal Koepfli, Christophe A. Wyss, Anna-Katharina Kuenzle, Monika Hanggi, Thomas F. Luscher, Philipp A. Kaufmann, University Hospital, Zürich, Switzerland.

Background: Despite of widespread use and evident clinical benefit of betablocker treatment (bbTx) in coronary artery disease (CAD) their impact on myocardial blood flow (MBF) and coronary flow reserve (CFR) remains unclear.

Aim: To evaluate non-invasively the effect of long-term oral betablocker treatment on coronary microcirculation in CAD-patients using Positron-Emission-Tomography (PET).

Methods: 13N-labelled NH₃ and PET was used to measure regional MBF (ml/min/g) at rest and during standard iv adenosine in 29 CAD-patients after 1 week washout of anti-ischemic drugs (baseline). Measurements were repeated after a period of 12 weeks with oral bbTx (metoprolol 100mg/d or carvedilol 2x25mg/d). CFR = hyperemic/resting-MBF. Results: MBF was similar in stenosis related (sten) and remote myocardial segments at baseline but significantly lower after bbTx paralleled by a decrease in heart rate. Hyperemic MBF was significantly lower in sten than remote (1.76 ± 0.64 vs. 2.04 ± 0.67 , $p<0.005$) at baseline but comparable after bbTx (1.90 ± 0.78 vs. 2.02 ± 0.68 , ns). CFR increased significantly in sten but not in remote segments.

Conclusions: Resting MBF decreases in proportion to cardiac work while hyperemic MBF remains unchanged in remote with a tendency to increase in stenotic segments. bbTx significantly increased CFR in sten - suggesting that the clinical benefit of bbTx in CAD is not only based on reduced oxygen consumption but also on increased hyperemic vascular response in affected coronary vessels.

**1057-88****The Acute Effect of Tea Consumption With a High Fat Meal on Flow-Mediated Brachial Artery Vasodilation in Healthy Individuals**

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Background: Antioxidant rich foods and beverages may play a beneficial role in cardiovascular disease prevention. Previous studies in healthy individuals demonstrated that acute consumption of high dose vitamins C and E blunted the transient reduction of brachial artery vasodilation, an index of endothelial vasomotor function, when taken with a high fat meal. This study evaluates whether tea along with a similar high fat meal improves endothelial function.

Methods: A double blind placebo controlled randomized cross-over study was performed on 30 healthy individuals (ages 20-55 yrs, M=13, F=17). Subjects were fed a 50gm, 900 cal high fat fast-food meal along with 3 different beverages (240cc of green tea, black tea or tea-like placebo) on 3 separate visits during a 14 day period. Brachial artery flow-mediated vasodilation (%FMD) using 11 MHz ultrasound was measured before and 3 hours after the meal and tea. Lipid analysis, glucose and insulin levels were obtained before and after each meal.

Results: Mean %FMD decreased by 2.1±4.8% pre and post-meal with placebo tea ($p=0.02$), but did not significantly decrease with green tea ($1.3 \pm 3.8\%$; $p>0.06$) or with black tea ($1.2 \pm 4.4\%$; $p=0.14$). Percent vasodilation in response to 0.4mg sublingual nitroglycerin was 24.5±8%.

Conclusion: These data suggest that black or green tea consumption with a high fat meal tends to blunt the decreased flow-mediated vasodilation observed with a high fat meal.

1057-89**Peak Diastolic/Systolic Velocity Ratio of Renal Segmental Arteries Assessed by Contrast-Enhanced Renal Perfusion Ultrasound Strongly Correlates With Estimated Creatinine Clearance**

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BACKGROUND: Renal perfusion is routinely evaluated via Doppler ultrasound assessment of systolic and diastolic flow velocities, and diastolic/systolic ratio (DSR) of the renal segmental arteries. This study evaluated the correlation between flow parameters assessed on renal perfusion ultrasound using IV second-generation ultrasound contrast (Optison), and renal function by estimated creatinine clearance.

METHODS: Vascular ultrasound data from 11 patients (7 male, mean age 65) with stable serum creatinine, undergoing contrast-enhanced renal perfusion ultrasound were analyzed. Bolus IV contrast was used for renal perfusion imaging and during acquisition of all Doppler flow velocities. The ATL-HDI 5000 ultrasound system and C5-2 2.5 MHz probe was used for all studies. Peak systolic and diastolic Doppler velocities were measured in the upper, mid and lower renal segmental arteries of both left and right kidneys. The DSR was calculated for each segmental artery and the mean of the 6 measurements determined. Estimated creatinine clearance (CrCl) was calculated using the standard equation developed by Cockcroft and Gault.

RESULTS: Mean DSR is plotted against creatinine clearance for each study and is sum-